**Twenty Second Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG/22)**

Papeete, Tahiti, 12-14 March 2008

**Agenda Item 4: Review Open Action Items
AI 21-3**

**IMPLEMENTING RE-ROUTE PROCEDURES -
A GUIDE FOR FLIGHT CREWS, AIRLINE OPERATIONS CENTRE(S) AND
AIR TRAFFIC SERVICES UNITS**

Presented by Airways New Zealand

SUMMARY

This paper describes the process to follow when re-routing an airborne aircraft. It is guidance material and its adoption will allow flight crews, AOCs and ATSUs to follow a set procedure using correct message sets when initiating a re-route request.

The availability of new weather forecasts on long haul routes or other information may allow airlines to request revised routing for airborne aircraft which will result in economic or safety benefit for the airline.

ATSUs and flight crew may also initiate re-route requests for various reasons.

For across FIR boundary flight, automated ATSU systems can transmit revised route data to each other electronically without requiring flight plan change notification from AOCs.

1.   **INTRODUCTION**

1.1   A guide for flight crews, Airline Operations Centre(s) and ATSUs wishing to implement re-route procedures.

2.   DISCUSSION

RE-ROUTE PROCEDURES –
AIRLINE OPERATIONS CENTRE (AOC) INITIATED - DARP

Purpose   To allow Airline Operations Centres to reroute an airborne aircraft after receipt of updated en-route weather forecasts or other information, where the revised routing will result in economic or safety benefit for the airline.

Objective   ✈ This guidance is intended to assist pilots, ATSUs and Airline Operations Centres when implementing Dynamic Airborne Re-route Procedures (DARP).

     ✈ These procedures shall be used where the DARP will occur in FIRs that have implemented Air Traffic Services Interfacility Data Communications (AIDC) which permits the electronic exchange of revised route information.

     ✈ The following ATSUs have implemented AIDC operationally in varying stages:
- Auckland
- Brisbane
- Nadi
- Oakland
- Fukuoka
- Anchorage

     ✈ For airborne rerouting, the following operational requirements apply:

1. The downlink CPDLC re-route request must be made by the flight crew at least 20min before the divergence point, to allow processing time by ATSUs and flight crew.
2. The re-route request should be made at least 60 minutes prior to the next FIR boundary to permit AIDC messaging to take place between the affected ATSUs.
3. The re-route request may be made to the new Data Authority, immediately after crossing the common FIR boundary.
4. Operational CPDLC is required for aircraft requesting airborne re-routes.

RE-ROUTE PROCEDURES –
AIRLINE OPERATIONS CENTRE (AOC) INITIATED – DARP (Continued)

STEP 1
Airline
Operations
Centre

✈ The Airline Operations Centre generates the re-route request based on receipt of updated en-route weather forecast or other information (e.g. volcanic activity).

✈ The re-route shall commence at a waypoint on the current route ahead of the aircraft and ending at the destination. The re-route shall include waypoints on each FIR boundary to be crossed.

When selecting the waypoint from which the reroute would begin, consideration should be given to:
- *The time it takes Airline Operations Centre to uplink the reroute to the aircraft.*
- *The flight crew to load the re-route into FMS and downlink the re-route request to the ATSU.*
- *The controller to process the request and uplink the corresponding clearance.*
- *The flight crew to load the clearance into the flight management system.*

Waypoints selected immediately ahead of the aircraft may result in aircraft crossing the waypoint prior to receiving a reroute clearance.

✈ Notify the flight crew that a planned DARP message including fuel savings is being sent to the flight deck via ACARS, Satvoice or data link as appropriate.
e.g. [ACID] DARP PLANNED AT POINT [WAYPOINT] FUEL SAVING + 240KG. DARP TO FOLLOW ON PRINTER.

✈ Send the DARP message including the fuel summary block to the flight deck for flight crew acceptance.

✈ Upon flight crew's acceptance of the DARP, uplink the new flight plan (re-route) to the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus).

Note: For DARP, Airline Operations Centre shall not send CHG message to ATSUs.

RE-ROUTE PROCEDURES –
AIRLINE OPERATIONS CENTRE (AOC) INITIATED – DARP (Continued)

STEP 2 **Flight Crew**	✈ Accept or Reject the DARP via ACARS to Airline Operations Centre. e.g. DARP ACCEPTED [REJECTED] ✈ On acceptance, load the new flight plan (re-route) into the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus). ✈ Where required, delete any waypoints on the revised route already crossed. ✈ Check the entire route sequence to revised destination. ✈ Downlink the modified re-route request to the controlling ATSU using the CPDLC downlink message #24: **REQUEST [departure airport: xxx destination airport: xxxx (fix1)(fix2)(fix3).....]** Where (fix1) is the waypoint ahead of the aircraft on the current route. The re-route may also contain ATS route designators. *Note: Flight crew procedures should stipulate the appropriate FMS message that conforms to CPDLC downlink message #24.*

RE-ROUTE PROCEDURES –
AIRLINE OPERATIONS CENTRE (AOC) INITIATED – DARP (Continued)

STEP 3
ATSU

✈ Check for conflicts and coordinate with adjacent ATSUs as required.

✈ Where the requested clearance is available:

- Uplink route clearance #83 with the departure airport deleted:

  AT [fix 1] CLEARED [destination airport: xxxx
  (fix1)(fix2)(fix3)….]
  Where (fix1) is the waypoint ahead of the aircraft on the current route.

- Transmit the aircraft's new cleared route data to the next ATSU via AIDC.

Note: AIDC Letters of Agreement between ATSUs must permit the processing and transmission of route information and any subsequent changes to the route.

✈ Where the requested clearance is not available:

- Uplink to flight crew "UNABLE. [DUE TO REASON] (e.g. UNABLE DUE TO TRAFFIC)"

Note: Where the downlink re-route needs to be modified by ATSU, flight crew must be informed.

RE-ROUTE PROCEDURES –
AIRLINE OPERATIONS CENTRE (AOC) INITIATED – DARP (Continued)

STEP 4
Flight Crew

✈ On receipt of a re-route clearance from ATSU, the flight crew shall:

- Check to ensure that the up linked ATC route clearance matches the route in the FMS and the printed flight plan.

  Note: The checking process must ensure that the FMS route matches the ATC uplink. Both of these should match the printed flight plan but if ATC have made minor changes to the requested route, this will be reflected in the up linked route and route clearance being identical, but differing to the printed flight plan.

- Accept the clearance. This will result in an acknowledgement (WILCO) message being sent to the ATSU confirming that the clearance will be complied with.

- Load the re-route clearance into the active route of the FMS.

- Check to ensure that the lateral navigation (LNAV) track displays direct to the next waypoint.

- Execute and verify aircraft tracking.

- Send an ACARS message to the Airline Operations Centre notifying that the aircraft is operating on the amended clearance.

- Where required for aircraft type, request from Airline Operations Centre the new en-route weather forecast at current level and the three levels above the current level. This will enable more accurate fuel and ETA predictions to be made.

- On receipt, load the en-route weather forecast data into the FMS active route.

✈ Where the re-route request is rejected by ATSU, the flight shall continue in accordance with existing ATC clearance.

RE-ROUTE PROCEDURES AOC INITIATED - DARP		
Aircraft Operations Centre	**Flight Crew**	**ATSU**
Generate the re-route		
Notify flight crew via ACARS of the planned DARP message.		
Send the DARP message to flight crew for acceptance.	Accept/Reject DARP via ACARS	
Upon acceptance, uplink the new flight plan (re-route) to flight crew.	Load the new re-route into the FMS **inactive route** (Boeing) or **Secondary F-PLN** (Airbus).	
	Delete waypoints already crossed.	
	Check entire route sequence to destination.	
	Downlink the modified re-route request to ATSU.	Check for conflicts and coordinate with adjacent ATSU as required.
		Where requested clearance is available, uplink clearance to flight crew.
	Check uplinked ATC route clearance matches the route in FMS and printed flight plan.	
	Accept the clearance.	Transmit the aircraft's new cleared route data to next ATSU via AIDC.
	Load the re-route clearance as an active route in FMS.	
	Check LNAV track displays direct to next waypoint.	
	Execute and verify aircraft tracking.	
	Send ACARS message to Operations Centre notifying that the aircraft is operating on an amended clearance.	
	Request and load the new en-route weather forecast into the FMS for accurate fuel and ETA predictions.	

RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – EMERGENCY

Objective   These re-route procedures are intended to provide guidance when an aircraft in an emergency has turned towards a new destination and advises their intention to an ATSU after the event.

    The procedures are applicable to both data link and voice (HF or SATCOM) aircraft.

Flight Crew ✈ If unable to obtain a revised ATC clearance, the aircraft should use the in-flight contingency procedures to turn towards an aerodrome of suitable landing.

    Note: The in-flight contingency procedures are included in the appropriate flight guides and therefore, have not been included.

  ✈ Advise ATSU of the flight level, aircraft position and intention as soon as practicable.

  ✈ Obtain an ATC clearance at the earliest possible time.

ATSU ✈ Where separation is lost or likely to be lost, instructions shall be issued to other aircraft involved which will re-establish separation with the minimum of delay.

  ✈ Provide essential traffic information where required.

  ✈ Where required, issue revised clearance to the aircraft in an emergency.

  ✈ Coordinate with applicable ATSU as required.

**RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – NON EMERGENCY**

Objective These re-route procedures are intended to provide guidance when an aircraft requires diversion to a revised destination. The destination may be a new one or the original.

Where possible, the re-route request must be made at least 20min before the divergence point, to allow processing time.

Flight Crew ✈ Load the new flight plan (re-route) into the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus).

✈ Where possible, include waypoints on each FIR boundary to be crossed and delete any waypoints on the revised route already crossed.

✈ Check the entire route sequence to revised destination.

RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – NON EMERGENCY (Continued)

DATA LINK AIRCRAFT

Flight Crew   In the scenarios below, the flight crew should downlink the re-route request to the controlling ATSU using the following messages;

✈   Reroute request from a **waypoint** on the current route, thence via waypoints and/or ATS route designators to revised destination:

- Use CPDLC downlink re-route request message #24:

  REQUEST [departure airport: xxx destination airport: xxxx (fix1)(fix2)(fix3)…..]
  Where (fix1) is the waypoint ahead of the aircraft on the current route.

✈   Reroute request at the earliest possible **time** thence via waypoints and/or ATS route designators to revised destination:

- Use CPDLC downlink re-route request message #24:

  REQUEST [departure airport: xxx destination airport: xxxx (fixes on the new route)]

Note: This situation may arise when the next waypoint is significant distance ahead and there is a need to expedite the diversion. Due to CPDLC message constraint, an ATSU reroute clearance up linked to the aircraft may specify a turn from the next waypoint on the current route with the following free text attached. "EXPECT MORE DIRECT ON ACCEPTANCE OF CLEARANCE". Once the flight crew has accepted the clearance, the ATSU will uplink the following clearance "AT (time) PROCEED DIRECT TO (1st waypoint on revised route).

✈   Reroute request **direct** to a revised destination.

- Use CPDLC downlink re-route request message #22:

  REQUEST DIRECT TO [departure airport: xxxx destination airport: xxxx (destination fix)]

- Downlink re-route request message #24 may also be used with destination fix only.

Note: 1. Flight crew procedures should stipulate the appropriate FMS message that conforms to CPDLC downlink message #24 and #22.
2. When not requesting direct to a destination, the re-route may also contain ATS route designators.

RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – NON EMERGENCY (Continued)

DATA LINK AIRCRAFT

ATSU   ✈ Check for conflicts and coordinate with adjacent ATSUs as required.

✈ Where the requested clearance is available:

- Issue clearance using CPDLC uplink re-route message #83 with the departure airport deleted and adding a free text message at the end.

  AT [fix1] CLEARED destination airport: xxxx
  (fix1)(fix2)(fix3).....]
  Freetext : **"Expect more direct on acceptance of clearance"**

  Where (fix1) is the waypoint ahead of the aircraft on the current route.

- On receipt of a **WILCO** message from the pilot, issue a more direct routing to the first waypoint on the revised route using CPDLC message #76.

  AT (time) PROCEED DIRECT TO [fix2]
  Where (fix2) is the first waypoint on the revised route.

Note: The above two steps are required due to CPDLC message set constraint and the need for the flight crew and the ATSU to use CPDLC messages that are armable in the FMS. Time selected should allow for processing time by flight crew.

- Notify the next ATSU of the aircraft's new cleared route data.

✈ Where the requested clearance is not available:

- Uplink to flight crew "UNABLE. [DUE TO REASON] (e.g. UNABLE DUE TO TRAFFIC)"

Note: Where the requested route is not available, ATSU will deny the request and may propose an alternate routing.

**RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – NON EMERGENCY (Continued)**

VOICE (HF or SATCOM) AIRCRAFT

Flight Crew   In the scenarios below, the flight crew should make a reroute request to the controlling ATSU using the following messages;

✈ Reroute request from a **waypoint** on the current route, thence via waypoints and/or ATS route designators to revised destination:

**AT (fix1) REQUEST DIVERT TO [destination airport]
via (fix1)(fix2)(fix3)….]**
Where (fix1) is the waypoint ahead of the aircraft on the current route.

✈ Reroute request at the earliest possible **time**, thence via waypoints and/or ATS route designators to revised destination:

**REQUEST DIVERT TO [destination airport] VIA
(fixes on the new route)]**

Note: Time may be used when the next waypoint is a significant distance ahead. ATSU reroute clearance to the aircraft may specify a time to execute the diversion.

✈ Reroute request **direct** to a revised destination.

REQUEST DIVERT TO [destination airport] DIRECT.

Note: When not requesting direct, the re-route may also contain ATS route designators.

ATSU   ✈ Check for conflicts and coordinate with adjacent ATSUs as required.

✈ Where the requested clearance is available:

• Issue appropriate route clearance.

• Notify the next ATSU of the aircraft's new cleared route data.

✈ Where the requested clearance is not available:

• Send to flight crew "UNABLE. [DUE TO REASON]
(e.g. UNABLE DUE TO TRAFFIC)"

Note: Where the requested route is not available, ATSU will deny the request and may propose an alternate routing.

RE-ROUTE PROCEDURES –
FLIGHT CREW INITIATED – NON EMERGENCY (Continued)

OFFSET

Offset
  ✈ Requests for offset shall not be made by the flight crew. Where offset is required, flight crew shall make either a re-route or deviation request.

  Note: Most Offset requests down linked to ATSU are due to flight crew not selecting the reason "due to weather". ATSU will deny this request and issue a weather deviation clearance to the same limit.

  ✈ Procedures for flight crew who apply strategic lateral offset procedures (SLOP) to reduce the perceived increase in risk of collision are located in state AIPs.

  ✈ An ATSU may request an aircraft to offset to facilitate an aircraft's climb or descent. Aircraft will be cleared back on original route when the required separation is achieved.

RE-ROUTE PROCEDURES – FLIGHT CREW INITIATED	
EMERGENCY	
Flight Crew	**ATSU**
If unable to obtain a revised ATC clearance, use the in-flight contingency procedures to divert.	
Advise ATSU of the flight level, aircraft position and intention as soon as practicable.	Where separation is lost or likely to be lost, issue instructions to other aircraft involved which will re-establish separation with the minimum of delay.
	Provide essential traffic information where required.
Obtain ATC clearance at the earliest possible time.	Issue revised clearance to the aircraft.
	Coordinate with applicable ATSU as required.
NON EMERGENCY	
Flight Crew	**ATSU**
Load the new flight plan (re-route) into the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus).	
Delete waypoints already crossed.	
Check the entire route sequence to destination.	
Downlink (Datalink) or make (Voice aircraft) re-route request to ATSU.	Check for conflicts and coordinate with adjacent ATSU as required.
	Where requested clearance is available, issue the clearance to the flight crew.
Check that the received ATC route clearance matches the route in FMS.	Where requested route is not available, deny the original request and then propose an alternate routing.
Accept the clearance.	
	Notify the next ATSU of the aircraft's new cleared route data.
Load the re-route clearance as an active route in FMS.	
Check LNAV track displays direct to next waypoint.	
Execute and verify aircraft tracking.	
Send ACARS message to Operations Centre notifying that the aircraft is operating on an amended clearance.	
Request and load the new en-route weather forecast into the FMS for accurate fuel and ETA predictions.	

RE-ROUTE PROCEDURES – ATSU INITIATED

Objective   These re-route procedures are intended to provide guidance when an ATSU requires aircraft to follow a revised route to the destination.

When initiating a revised route, an ATSU should take into consideration the effect of the revised route on an aircraft's flight requirements e.g. ETOPS, UPR for fuel economy, Search and Rescue, Mercy flight, etc. Prior coordination with the flight crew or the AOC may be necessary to ensure the aircraft can accept the revised route.

DATA LINK AIRCRAFT

ATSU   ✈   Compose a re-route clearance using CPDLC message #83, preceded by the reason.
e.g. DUE TO TRAFFIC, DUE TO AIRSPACE RESTRICTION.

DUE TO AIRSPACE RESTRICTION
AT (fix1) CLEARED [destination airport: xxxx
(fix1)(fix2)(fix3)….]
Where (fix1) is the waypoint ahead of the aircraft on the current route.

✈   Check for conflicts and coordinate with adjacent ATSUs where required.

✈   Uplink the re-route clearance to the aircraft.

✈   On receipt of a **WILCO** message from the pilot and where desired, issue a more direct routing to the first waypoint on the revised route using CPDLC message #76.

AT (time) PROCEED DIRECT TO [fix2)
Where (fix2) is the first waypoint on the revised route.

Note: The above steps are required due to CPDLC message set constraint and the need for:
-    *The flight crew and the ATSU to use CPDLC messages that can be armed in the FMS.*
-    *The flight profile in the FMS and ground ATS system being identical. Time selected should allow for processing time by flight crew.*

✈   Where required, notify the next ATSU of the aircraft's new cleared route data.

RE-ROUTE PROCEDURES – ATSU INITIATED (Continued)

VOICE (HF or SATCOM) AIRCRAFT

ATSU ✈ Compose a re-route clearance preceded by the reason.
e.g. DUE TO TRAFFIC, DUE TO AIRSPACE RESTRICTION.

✈ Check for conflicts and coordinate with adjacent ATSUs as required.

✈ Issue re-route clearance to the aircraft.

✈ Where required, notify the next ATSU of the aircraft's new cleared route data.

DATALINK AND VOICE AIRCRAFT

Flight Crew ✈ Load the new flight plan (re-route) into the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus).

✈ Delete any waypoints on the revised route already crossed.

✈ Check the entire route sequence to destination.

✈ Accept the clearance.

✈ Load the re-route clearance into the active route of the FMS.

✈ Check to ensure that the lateral navigation (LNAV) track displays direct to the next waypoint.

✈ Execute and verify aircraft tracking.

RE-ROUTE PROCEDURES – ATSU INITIATED (Continued)

OFFSET

Procedures for flight crew who apply strategic lateral offset procedures (SLOP) to reduce the perceived increase in risk of collision are located in state AIPs.

ATSU	✈ An ATSU may request an aircraft to offset a distance from its cleared route to facilitate an aircraft's climb or descent using CPDLC uplink message # 65 or # 66, preceded by the reason. e.g. TO FACILITATE YOUR DESCENT

TO FACILITATE YOUR DESCENT INTO (destination airport) AT (time/position) OFFSET (direction)(distance offset) OF ROUTE REPORT ESTABLISHED ON OFFSET VIA FREETEXT

✈ Aircraft should be cleared back on original route when the offset is no longer required using CPDLC uplink message #68 or #69.

REJOIN ROUTE BY (time/position)

Flight Crew

✈ Load the clearance into FMS.

✈ Accept the clearance.

✈ Check to ensure the lateral navigation (LNAV) track displayed at correct distance from the cleared route.

✈ Advise ATSU when established on the offset.

✈ When cleared to rejoin route;
- Accept the clearance
- Downlink a **"back on route"** message when aircraft is established on the original route.

| RE-ROUTE PROCEDURES ATSU INITIATED ||
Flight Crew	ATSU
	Compose a re-route clearance, preceded by the reason. e.g. DUE TO TRAFFIC DUE TO AIRSPACE RESTRICTION
	Check for conflicts and coordinate with adjacent ATSUs where required.
	Uplink/Send the re-route clearance to the aircraft.
Where the re-route clearance is acceptable, load the new flight plan (re-route) into the FMS **Inactive route** (Boeing) or **Secondary F-PLN** (Airbus).	
Delete any waypoints on the revised route already crossed.	
Check the entire route sequence to destination.	
Accept the clearance.	On receipt of a **WILCO** message from the pilot and where desired, issue a more direct routing to the first waypoint on the revised route using CPDLC message #76.
	Where required, notify the next ATSU of the aircraft's new cleared route data.
Load the re-route clearance as an active route in FMS.	
Check LNAV track displays direct to next waypoint.	
Execute and verify aircraft tracking.	
Where required, send ACARS message to Operations Centre notifying that the aircraft is operating on an amended clearance.	
Where necessary, request and load the new en-route weather forecast into the FMS for accurate fuel and ETA predictions.	

3.   ACTION BY THE MEETING

3.1   ISPACG is invited to raise an RFC to include these re-route procedures in the FOM.